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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,532	06/27/2003	Keith W. Reiss	144008.00300	6160
7590 10/10/2007 James Remenick (Powell Goldstein LLP) 901 New York Avenue, NW Third Floor Washington, DC 20001-4413			EXAMINER SODERQUIST, ARLEN	
			ART UNIT 1797	PAPER NUMBER
			MAIL DATE 10/10/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/607,532	Applicant(s) REISS, KEITH W.	
	Examiner Arlen Soderquist	Art Unit 1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 July 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7-12-07 and 7-25-07</u> . | 6) <input type="checkbox"/> Other: _____ |

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1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
2. Claims 1-15 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schafer (Berichte der Bunsen-Gesellschaft, 1983) in view of van der Weide (SPIE, 1999 or NATO Science Series, II, 2001). In the paper Schafer teaches a broadband submillimeter wave spectrometer system with on-line microcomputer data analysis substantially as claimed. A submillimeter wave spectrometer operating in the frequency range 100 to 800 GHz was constructed for the study of transient molecules in the gas phase. The instrument is shown in figure 1 and employs harmonic generation of millimeter wave frequencies and a He-cooled InSb photoconducting detector. A high degree of flexibility is achieved using an exchangeable free-space Pyrex absorption cell and a microcomputer for on-line data analysis. The spectrometer can be operated in a free-running video mode together with a fast signal averager or phase-locked to a microwave reference with source modulation. Pages 329-330 discuss the frequency control and measurement including the use of generated frequency markers. Pages 330-333 and figures 9 and 12 discuss and show the data acquisition and analysis including the use of the frequency markers to determine the frequency of the absorptions. The reproducibility of line center frequency measurements up to 600 GHz is ± 10 kHz. Transitions with absorption coefficients of at least $3 \times 10^{-8} \text{ cm}^{-1}$ can be detected in the range from 150 to 250 GHz. Ground state rotational transitions of OCS between 200 and 690 GHz are reported and analyzed together with previous data. Schafer does not teach the use of a solid state oscillator or detector.

The van der Weide papers have a similar disclosure and only the SPIE paper will be described. In the SPIE paper van der Weide discusses spectroscopy with electronic terahertz techniques. The authors report gas absorption spectra and energetic material reflection spectra measured with an all-electronic terahertz (THz) spectrometer. This instrument uses phase-locked microwave sources to drive picosecond GaAs nonlinear transmission lines, enabling measurement of both broadband spectra and single lines with hertz-level precision, a new mode of operation not readily available with optoelectronic THz techniques. The authors take 2 approaches to coherent measurements: (1) spatially combining the freely propagating beams from 2 coherent picosecond pulse generators, or (2) using a more conventional coherent source/detector arrangement with sampling detectors. The 1st method employs a dual-source interferometer modulating each harmonic of 1 source with a precisely-offset harmonic from the other source - both sources being driven with stable phase-locked synthesizers - the resultant beat frequency can be low enough for detection by a standard composite bolometer. Room-temperature detection possibilities for the DSI include antenna-coupled Schottky diodes. The first paragraph of the introduction teaches the need for integrated circuit sensors in the terahertz (THz) frequency region for multi-species gas sensing applications. The paragraph bridging pages 276-277 and the rest of the discussion on page 277 teach the use of solid state oscillators for generation of radiation in this region and the use of a solid state Schottky diode detection structure to detect the signal at room temperature. The prototype system that they had constructed was small (170 mm long, 120 mm wide, and 80 mm high) with the possibility of constructing an even more compact system being taught. The conclusion on page 283 presents some advantages for the system including an all electronic system that eliminates the need for moving parts and cost advantages.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the oscillator and detector used by Schafer with the all electronic versions taught by van der Weide because of the cost, size and lack of moving parts advantages taught by van der Weide for a solid state electronic device.

3. Claims 16-19 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schafer in view of van der Weide as applied to claims 1-15 and 22-28 above, and further in view

of Stumpf (US 4,989,433). Schafer teaches analysis of gaseous/atmospheric molecules, but does not teach a trap to concentrate them.

In the patent Stumpf teaches method and means for condensing trace air contaminants from gases. A metallic sample block has formed therein a serpentine shaped duct containing glass beads. The block is secured in thermally conductive contact with a thermoelectric element to which voltage of one polarity is applied to chill the block to a range of approximately -25°C . to -90°C . When the block temperature has been lowered sufficiently a gas sample is conveyed in one direction through the duct causing contaminants therein to be condensed out on the beads. Thereafter the polarity of the voltage applied to the thermoelectric element is reversed to cause it to heat the block and vaporize the previously condensed contaminants, after which a carrier gas is conveyed in the opposite direction through the duct to a gas analyzer device. Column 1 teaches that it has long been customary in gas chromatography (GC) to utilize a cryogenic means for trapping or condensing trace contaminants out of a gaseous phase. This invention relates to an improved method and cryogenic means for condensing trace air contaminants for delivery to a gas chromatograph column or the like which is particularly suited for use in a laboratory or in the field. Thus, it is an object of this invention, to provide an improved method and apparatus of separating out and concentrating trace contaminants from gases such as air, or the like, thereby considerably simplifying cryogenic gas trapping (CGT) procedures. A further object is to provide as the improved CGT apparatus considerable reduction in the size and the cost of the equipment which is particularly adapted for use in a laboratory surrounding, or which can be made portable to permit ready collection of contaminate samples in the field.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method and means for condensing trace air contaminants from gases as taught by Stempf into the Schafer method and apparatus for the benefits taught by Stempf.

4. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schafer in view of Weide as applied to claims 1-15 and 22-28 above, and further in view of Cocatre-Zilgien (US 6,012,675). Schafer does not teach using a global positioning system to record the coordinates of the sampling locations.

In the patent Cocatre-Zilgien teaches an aircraft system monitoring air humidity to locate updrafts. An aircraft system intended for gliders and low power-to-weight aircraft, to aid the

pilot in locating updrafts associated with the buoyancy of humid air in the convective layer of the atmosphere, namely moist thermals. The system comprises a pair of laterally spaced hygrometers, generally at the wingtips. Four types of hygrometer units are described; resistive, piezoelectric, spectrometric, and capacitive. Humidity data is transmitted to the cockpit by telemetry links, of which four types are also described; by dedicated wiring, by carrier current using wingtip position lights wiring, by modulated infrared beams, and by low-power radio waves. The system monitors the difference of humidity between left and right sensors, and also the rate of change of humidity of one or both sensors as a function of time. This lateral and eventually axial differential humidity information is presented to the pilot via a visual interface such as bargraph displays and computer monitors, or via an audio interface producing sounds of variable pitch or beat in one or more cockpit loudspeakers, or via both interfaces simultaneously. For humidity measurements inherently sensitive to temperature, such as relative humidity, either the hygrometers are heated, or their temperature is also measured so that temperature effects can be subsequently removed by computation. This system enables the pilot to get a better understanding of the thermodynamics of the convective layer of the atmosphere. Columns 2-3 teach that measuring the humidity of ambient air around an airplane is not new. Atmospheric moisture is one of the key elements in meteorological assessment and weather forecasting. Many air sounding aircraft are equipped with a combination of several types of sensors, such as Lyman-alpha hygrometers for absolute humidity, chilled-mirror thermoelectric hygrometers for dew-point, microwave resonance cavities for measuring microwave refracting index, hot-wire evaporators for cloud liquid-water content, among others. This information is collected for weather forecast purposes, and is not used for the management of the flight itself. These methods generally provide an actual humidity reading that is as accurate as possible. Humidity is a variable which is inherently more difficult to measure than temperature. Not only is there a very wide variety of humidity measuring devices, but there are many ways of expressing humidity itself, such as mixing or mass ratio, specific humidity, absolute humidity, volume ratio, partial pressure, dew point, relative humidity, etc. The majority of common humidity sensors provides an output in terms of relative humidity (RH), which is the ratio between actual water vapor partial pressure and saturation water vapor pressure at the same temperature. Relative humidity depends heavily on temperature by definition. The summary teaches that the system

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includes the following functionally linked elements: a left humidity sensor, a right humidity sensor, spanwise humidity data telemetry links towards some medial location, and finally, a pilot interface in the cockpit. There is a wide variety of methods for measuring humidity, even at the relatively low levels that can be found in flight. Accordingly, four different embodiments of the same system are described, each based on one of the major types of humidity sensors, namely resistive, piezoelectric, spectrometric, and capacitive. The four embodiments of the system also use different telemetry methods, by wire, infrared beam, or radio waves, and different analog or digital types of pilot interfaces. Column 15 teaches that the absorption spectrometer of the 3rd embodiment can operate on other water absorption bands between the near-infrared and the microwave range. Furthermore, other types of hygrometers than those described can be used in the present system, for example fast cryogenic devices, Fabry-Perot fiber optic humidity analyzers, radiosonde equipment, or those mentioned in the Prior Art section of columns 1-3. It will also be apparent that the humidity data gathered by the present system can be integrated in a computerized Flight Management System with temperature and barometric data as in a standard meteorological sounding, and furthermore, with vertical axis inertial data from an accelerometer and with the geographical coordinates from a Global Positioning System, so as to generate for the pilot a form of real-time map of actual and probable updrafts.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the other measurements with the geographical coordinates from a Global Positioning System as taught by Cocatre-Zilgien into the device and method of Schafer because of the ability to generate for the pilot a form of real-time map of actual and probable concentrations and updrafts as taught by Cocatre-Zilgien.

5. Applicant's arguments filed July 12, 2007 have been fully considered but they are not persuasive. First the combination of Schafer and van der Weide is rather good since the major difference is the provision of solid state devices as detector and source of the submillimeter frequencies. In this respect the van der Weide reference shows clear advantages for using a solid state frequency generator and detector or submillimeter frequencies. Thus, there is clear motivation for making the changes. Second the van der Weide references are after the Schafer references and so they represent the manner in which the industry/marketplace developed relative to the production and detection of submillimeter waves between the time Schafer was

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published and the time that van der Weide was published. Additionally, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Relative to the Stumpf reference, it does not have to show what Schafer and van der Weide teach or would have made obvious. It is directed to how to increase one's ability to detect analytes that are present in amounts that are not easily detectable by separating them from other components. In this respect it clearly shows that one of ordinary skill in the art knows how to concentrate an analyte prior to detection by separating them from other components of the gas as a means to increase the ability to detect those components that would have had concentrations that are not easily detected. Relative to claims 20-21 examiner notes that a chemical species could include moisture or any other chemical that one wishes to detect. The Cocatre-Zilgien reference clearly shows that there are advantages to using a global positioning device to log locations when one is taking samples at a number of locations. This certainly would have been obvious to one of ordinary skill in the art at the time the invention was made.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additionally cited art relates to microwave/submillimeter spectrometers and means to concentrate trace components of a sample gas.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose telephone number is (571) 272-1265. The examiner can normally be reached on Monday-Thursday and Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Arlen Soderquist
Primary Examiner
Art Unit 1743

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REPLACEMENT PAGE

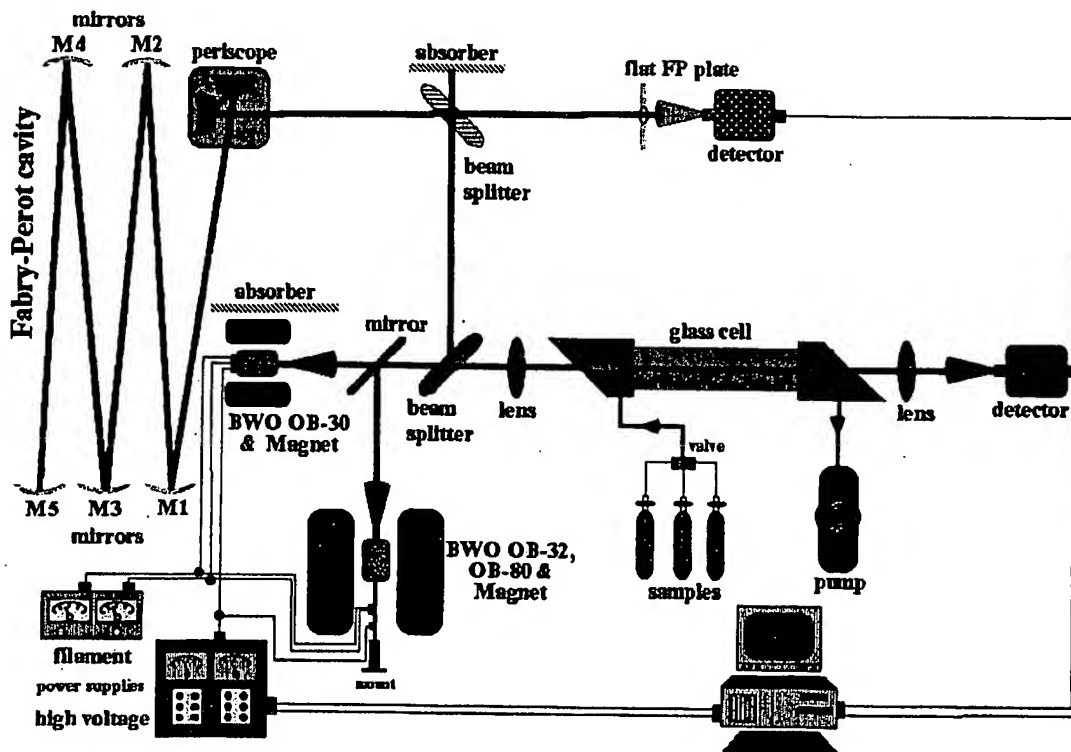


Figure 1

PRIOR ART

Delay to enter as 10/1/07

PRIOR ART

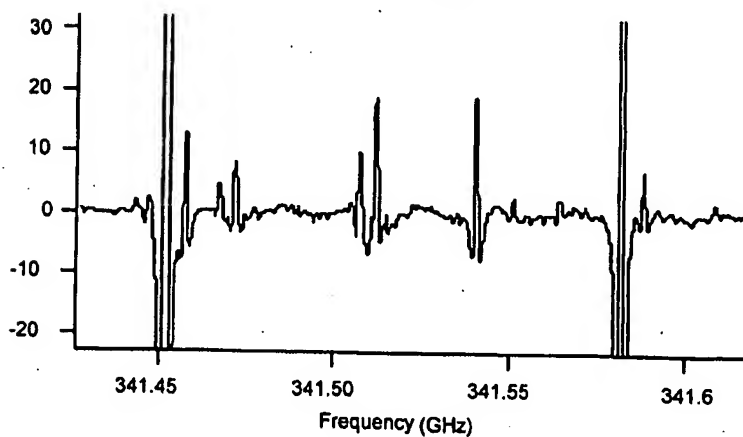
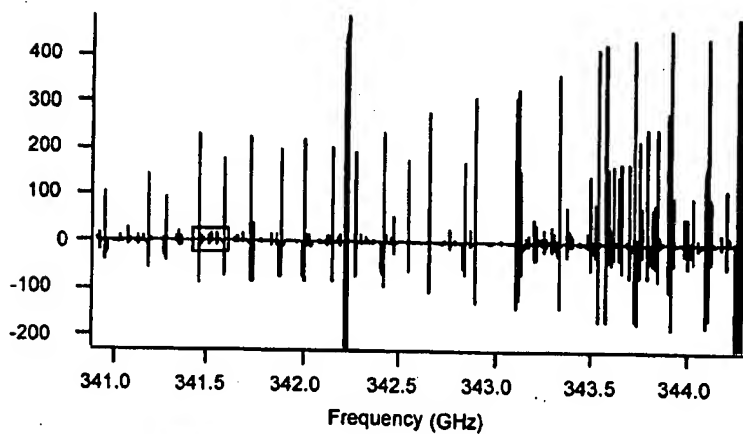
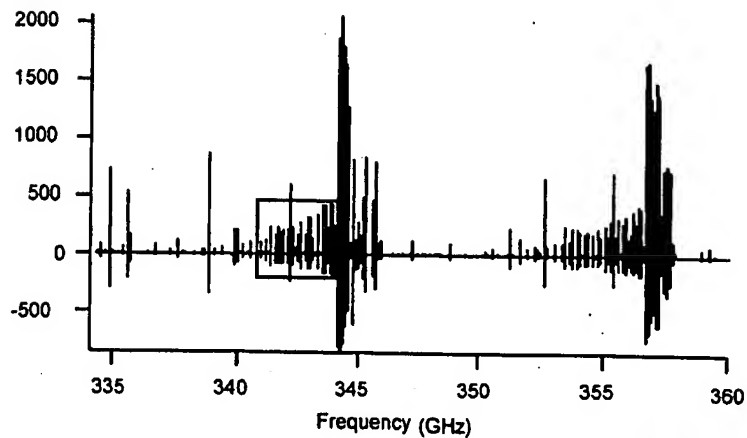


Figure 2

REPLACEMENT PAGE

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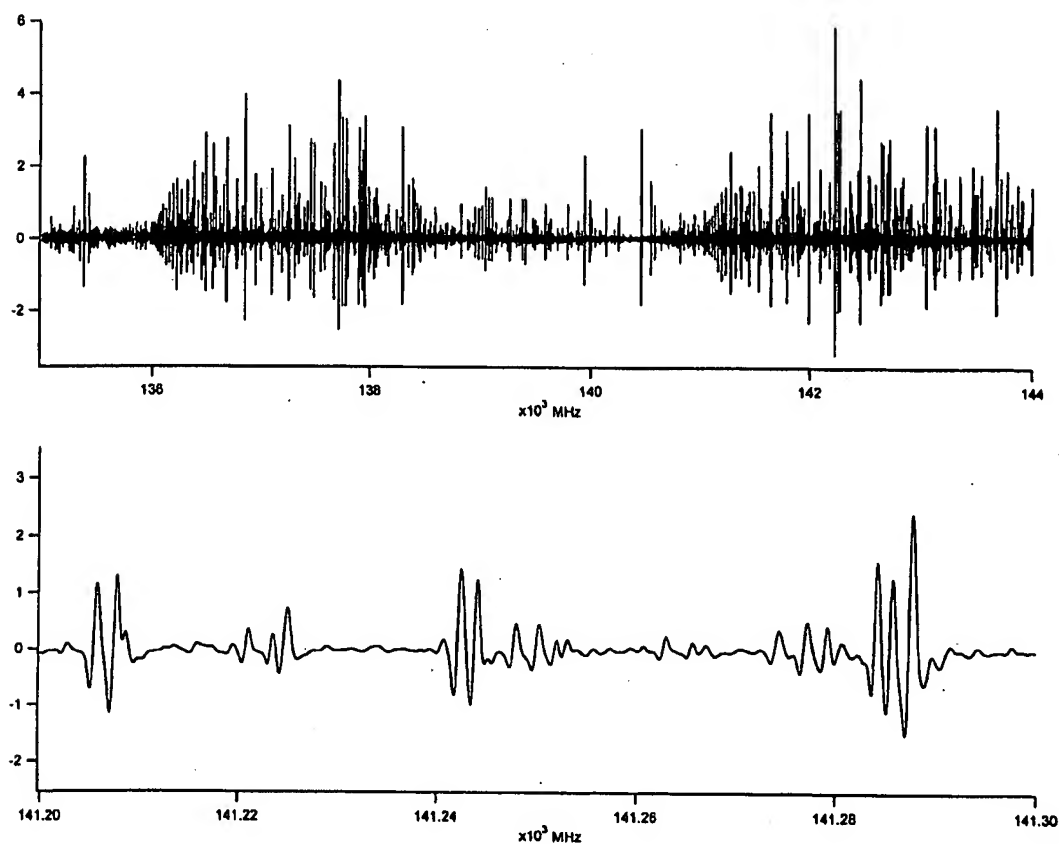


Figure 3

PRIOR ART